IN THE SENATE OF THE UNITED STATES.

LETTER

FROM

THE SECRETARY OF WAR,

IN RESPONSE

To Senate resolution of December 12, 1892, relative to the ship channel between Cumberland Island, Georgia, and Fernandina, Fla.

JANUARY 5, 1893.—Referred to the Committee on Commerce and ordered to be printed, omitting maps.

WAR DEPARTMENT,
Washington, January 3, 1893.

SIR: By resolution of the Senate, dated December 12, 1892, the Secretary of War is "directed to furnish to the Senate any information in possession of the Chief of Engineers as to the condition of the present ship channel between Cumberland Island, Georgia, and Fernandina, Fla., and the injury to it from the construction of the north jetty and its present unfinished condition, and as to the danger of the closing of the channel on account of the obstruction created by this work and the necessity for an immediate appropriation to prevent the closing of the channel."

In response to that resolution I have the honor to transmit herewith a letter from the Chief of Engineers, dated December 27, 1892, submitting a copy of a report, dated December 22, 1892, with two maps,* on the subject, from Capt. O. M. Carter, Corps of Engineers, the officer in charge of the improvement, which report the Chief of Engineers remarks contains the latest information in his office respecting the locality mentioned.

Very respectfully,

S. B. ELKINS,
Secretary of War.

The PRESIDENT OF THE UNITED STATES SENATE.

*Omitted in printing.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 27, 1892.

SIR: I have the honor to acknowledge the reference to this office for report of resolution dated December 12, 1892, of the Senate of the United States, by which the Secretary of War is "directed to furnish to the Senate any information in possession of the Chief of Engineers as to the condition of the present ship channel between Cumberland Island, Georgia, and Fernandina, Fla., and the injury to it from the construction of the north jetty and its present unfinished condition, and as to the danger of the closing of the channel on account of the obstruction created by this work and the necessity for an immediate appropriation to prevent the closing of the channel."

In returning the resolution of the Senate, I have to submit the accompanying copy of report, with two maps, of the 22d instant, on the subject, by Capt. O. M. Carter, Corps of Engineers, the officer in charge of the improvement, which contains the latest information in this office respecting the locality mentioned.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

Hon. S. B. ELKINS,
Secretary of War.

REPORT OF CAPTAIN O. M. CARTER, CORPS OF ENGINEERS, ON THE CONDITION OF THE SHIP CHANNEL BETWEEN CUMBERLAND ISLAND, GEORGIA, AND FERNANDINA, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Savannah, Ga., December 22, 1892.

GENERAL: I have the honor to submit herewith a report on the condition of the ship channel between Cumberland Island, Georgia, and Fernandina, Fla., as required by Senate resolution of December 12, 1892, and instructions from the Chief of Engineers of December 13, 1892.

There are submitted with this report a map of the entrance to Cumberland Sound, Georgia and Florida, showing characteristic soundings and curves of equal depth on the bar and adjacent shoals, as developed by an examination made during the month of November last, and a sheet of comparative charts reduced from the survey of 1889, and from examinations made in November, 1891, May, 1892, and November, 1892. The former shows the conditions now existing; the latter shows the changes that have taken place since the year 1890, through which the present conditions have been reached.

On the chart for 1889 there is found a deep channel of ample width along the northern side of the south jetty. The 12-foot curve is fully 900 feet from the jetty at its nearest point. Farther out it recedes from the line of the jetty and is widely separated from the southern 12-foot curve, which reaches northward beyond the prolongation of the jetty axis. The inner 18-foot curve extends to within 800 feet of the end of the finished foundation course, with only a slight break in its continuity; and the 15-foot curve extends without a break beyond the end of the south jetty. Fifteen and 18 foot areas are again found farther seaward. The 18-foot area appeared south of the jetty only as a narrow strip close to the jetty and less than 100 feet in width.

A partial examination made in June, 1890 (not shown on this sheet), showed that the northern 12-foot curve had approached to within 400 or 500 feet of the south jetty, but the general line and depth of the channel were still maintained.

The examination of November, 1891 (Comparative Chart No. 2), shows that great and very undesirable changes have taken place. The north shoals have continued their southerly advance, and at the end of the south jetty the 12-foot curve is only 200 feet distant. The 15-foot curve has replaced the 18-foot curve of 1889, and the 18-foot area is greatly reduced. But the worst feature of these changes is found in the extension of the northern 12-foot shoal across the channel beyond the jetty and its union with the shoals south of the jetty, and also in the deepening that has taken place along the southern side of the jetty. The 18-foot area south of the jetty has attained a width of about 700 feet, and the 15-foot area has been pushed far beyond the end of the jetty. The channel still lies north of the jetty, but makes a sharp and difficult curve in crossing the 12-foot shoal.

The examination of May, 1892 (Chart No. 3), presents further unfavorable conditions. There have been no marked changes north of the outer end of the south jetty; but on the southern side of the jetty the scour has continued, breaking through the 12-foot shoal and pushing the inner 15-foot curve out to a point only 400 or 500 feet from the 15-foot curve on the outer slope of the bar. The channel line is now south of the outer end of the south jetty, and runs due east and west.

The examination made last month, November, 1892 (Chart No. 4), shows little or no change in the channel line since last May. The 12-foot curves both north and south of the south jetty remain practically the same. The 15-foot area south of the jetty has contracted to a slight degree. Additional shoaling has, however, occurred in the old channel north of the jetty. Fifteen-foot areas are found in November where 18-foot areas existed in May.

There is still a practicable channel along the northern side of the south jetty, but it turns to the south at the present end of the jetty, crossing the line of the proposed extension. If we imagine this jetty completed without any change in existing depths, there would be only 11.7 feet of water at the shoalest point of the resulting channel. In the channel now used the shoalest water is found just before reaching the outer slope of the bar. The minimum channel depth is 12.6 feet. The outer slope of the bar is very steep, the distance between the 15 and 24 foot curves being only from 200 to 300 feet.

There remain to be noted the increase and the seaward movement of those areas of the north shoals that rise above the level of mean low water and the seaward advance of the outward slope of the bar. The outer 15-foot curve has been pushed out about 350 feet since the year 1889.

From the report of the Board of Engineers on the improvement of Cumberland Sound, Georgia and Florida, dated New York City, March 11, 1891, there may be quoted as bearing on this subject the following words:

> The present condition of this improvement can not be regarded as satisfactory, especially in view of the fact that the funds now available, or likely soon to become available, are insufficient to execute the work required by the existing conditions to be done with great promptitude. This is apparent from the following statement: The north jetty in no degree checks the natural encroachment of the sand advancing from north to south upon the channel across the bar. This movement, as shown above, has continued since 1879 and, although perhaps checked a little by the incomplete south jetty, now threatens to shoal up the narrow passage still remaining

north of it and thus to compel the whole flow to cross the jetty. The survey of June, 1890, showed that the width between the jetty and the northerly 12-foot curve had been reduced from 900 feet in 1889 to about 400 feet.

The proposed locus of the deep-water entrance is thus choked up by an immense mass of sand, which already throws a strong current over the outer extremity of the south jetty, or rather over the single foundation course which represents a jetty in this vicinity. Moreover, an extensive southerly pocket exists in the southerly 12-foot contour, which crosses the line of the jetty still further shoreward, and this may assist the navigable bar channel to desert the desired route entirely.

And further from the same report:

The general order of work under future appropriations should be the following, considerable discretion being left to the engineer in charge, to meet new conditions as they arise: The construction of the north jetty should be first undertaken, and it should be raised to a height sufficient to effectually stop the sand movement southward; then the south jetty should be raised and extended as may be found necessary to obtain the desired depth over the bar.

The dangers foreseen and pointed out in the words above quoted are now realized. The 12-foot curve has continued to encroach on the deep but narrow channel that follows the northern side of the south jetty, and has thrown to the eastward beyond the present end of the south jetty a spur that touches the proposed location of the end of this jetty and extends about 1,000 feet beyond that point. In November of last year this 12-foot curve was continuous across the bar and joined that from the south. Shortly afterward this curve was broken through south of the prolongation of the south jetty, thus causing "the navigable bar channel to desert the desired route entirely." The present channel crosses the line of the south jetty about 2,400 feet inside of the seaward end of the finished foundation course and passes 600 or 700 feet south of the end of the proposed jetty. Furthermore, the stability of the existing portion of the south jetty is threatened by the strong tidal currents thrown across it by the advancing shoals. An undermining action can not fail to attend the overflow of these cross currents, and unless the filling up of the outlet between the jetties be checked, the destruction of a portion of the south jetty is to be apprehended.

All of the funds that have become available since the year 1890 have been applied to the work of extending the foundation course of the north jetty, and this has reached a point 14,930 feet from the initial point, measured along the axis of the jetty. This work is now progressing as rapidly as its difficult location and extreme exposure will permit. A single course of mattresses and stone will, however, only to a slight degree check the southerly drift of the sand; and the funds now available will not permit such an extension, even of the foundation course, as will carry it across the shoals of drifting sand.

The shoals that now block the entrance could scarcely be maintained in their original dimensions, much less could they be advanced, in the face of the strong ebb currents sweeping their steep southern slopes, were it not that a constant and vast supply of material is brought to them from the north, enough not only to load the currents to their full transporting capacity, but in addition to leave a surplus on the slope of the shoals and thus increase their extent. If this supply were cut off the currents would have an opportunity to perform their legitimate work of erosion, instead of being taxed to their utmost in transporting extraneous material. The southerly drift of the sand can only be checked by extending and raising the north jetty, and that this should be done with great promptitude is apparent from a study of the dangerous conditions that now exist and that threaten to increase in gravity.

The raising of the south jetty would no doubt force the maintenance of a deep but exceedingly narrow channel close along its northern face,

but the excessive local scour generated would probably undermine the jetty and destroy the work if it should be attempted before the southerly advance of the shoals is checked, and the constant supply of sand drifting into the channel would be forced seaward and cause shoaling beyond the end of the jetty. Moreover, as the south jetty is located in deep water, the great cost and time requisite for raising it to an effective height would prevent the immediate remedy by this means of the existing unfavorable conditions.

The only effective remedy that can be applied is the extending and raising of the north jetty, thereby striking at the source of the difficulty and preventing the further encroachment of the shoals upon the narrow channel still remaining between them and the south jetty. The fact can not be disguised that should this movement be allowed to continue, there is a serious danger of the filling up of the channel to such an extent as to cause disastrous results to the shipping of the port of Fernandina, already embarrassed by the deterioration of the channel.

Fernandina is the deep-water port of the Atlantic Coast of Florida. It is the principal shipping point for the Florida phosphate rocks to foreign ports in deep-draft steamers, as well as for fruits and vegetables to northern ports. It is also the terminus of the Mallory line of steamships to New York and of the Florida Central and Peninsular Railroad, which reaches, with its connections, all parts of Florida.

Great and important interests are therefore involved in the maintenance of the bar channel, and it is imperative that the work on the north jetty should be pushed on until a height is reached sufficient to check the southerly drift of the sands and the consequent filling up of the channel. Should the work be stopped when the limited funds now available are exhausted, the advance of the shoals will continue, possibly to the extent of blocking this entrance entirely to deep-draft vessels.

A sum of at least $250,000 is imperatively necessary for such an extension and raising of the north jetty as will prevent the further shoaling of the channel, and an immediate appropriation of at least that amount is urgently requested.

Very respectfully, your obedient servant,

O. M. CARTER,
Captain, Corps of Engineers.

Brig. Gen. THOMAS L. CASEY,
Chief of Engineers, U. S. A.